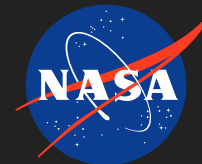


Low Density Supersonic Decelerators (LDSD)

Completed Technology Project (2011 - 2016)

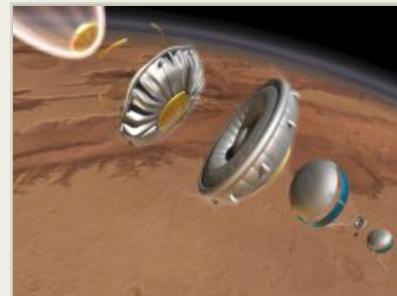


Project Introduction

The Low-Density Supersonic Decelerator project will demonstrate the use of inflatable structures and advanced parachutes that operate at supersonic speeds to more efficiently slow down a spacecraft navigating through planetary atmosphere prior to landing. These new supersonic inflatable and parachute decelerators will increase landed payload masses. They also will allow for higher-altitude landings and access to a larger portion of a planet's surface, and will enable improved targeting of safe landing sites. These new devices will be suitable for infusion into landed Mars missions, greatly extending performance capabilities. Flight testing is planned through 2015. Infusion customers include NASA's Science Mission Directorate and NASA's Human Exploration and Operations Mission Directorate. Key Mission Facts: -To safely land heavier spacecraft on Mars, larger parachutes and other kinds of drag devices that can be deployed at supersonic speeds are needed. - High in Earth's stratosphere, NASA's Low Density Supersonic Decelerator mission will test new, full-scale parachutes and drag devices at supersonic speeds to refine them for future use at Mars. Testing will be conducted through 2015, with potential launch to Mars as early as 2018. - Current Mars landing techniques date back to NASA's Viking mission, which put two landers on Mars in 1976. That mission's parachute design has been in use ever since and was used again in 2012 to deliver the Curiosity rover to Mars. To conduct advanced exploration missions in the future, however, NASA must advance the technology to a new level of sophistication since Viking-style parachutes' capabilities are limited. -These new drag devices are one of the first steps on the technology path to landing humans, habitats and return rockets safely on Mars.

Anticipated Benefits

These new supersonic inflatable and parachute decelerators will increase landed payload masses. They also will allow for higher-altitude landings and access to a larger portion of a planet's surface, and will enable improved targeting of safe landing sites. These new devices will be suitable for infusion into landed Mars missions, greatly extending performance capabilities. The project will also develop a pilot ballute that will provide mass and structural load benefits to a flight mission, as compared with a mortar-deployed supersonic parachute.



Project Image Low Density Supersonic Decelerators (LDSD)

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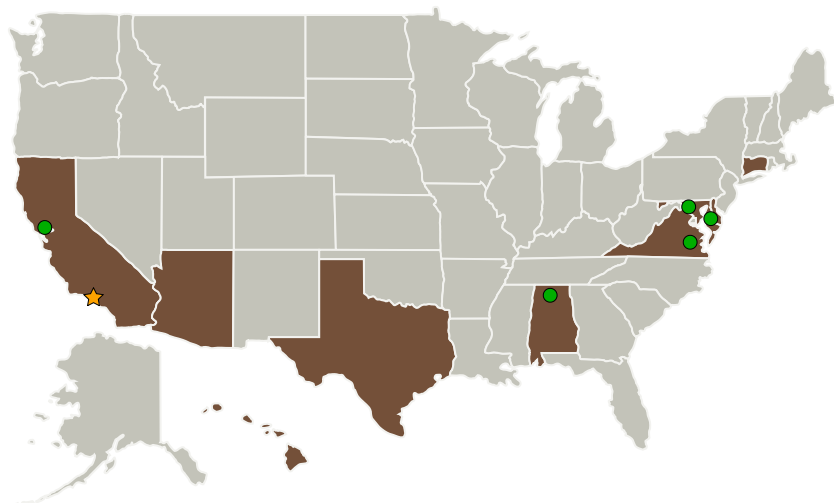
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Low Density Supersonic Decelerators (LDSD)

Completed Technology Project (2011 - 2016)



Primary U.S. Work Locations and Key Partners



Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Technology Demonstration Missions

Project Management

Program Director:

Trudy F Kortes

Program Manager:

Tawnya P Laughinghouse

Principal Investigator:

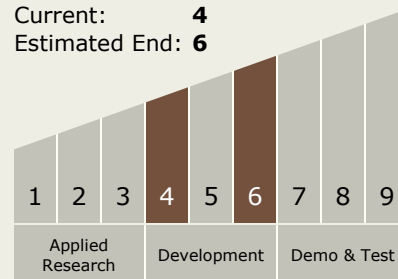
Mark R Adler

Technology Maturity (TRL)

Start: 4

Current: 4

Estimated End: 6



Low Density Supersonic Decelerators (LDSD)

Completed Technology Project (2011 - 2016)



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Airborne Systems North America of CA, Inc.	Supporting Organization	Industry	
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Columbia Scientific Balloon Facility	Supporting Organization	Academia	New York, New York
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
ILC Dover	Supporting Organization	Industry	Newark, Delaware
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
Navy	Supporting Organization	US Government	
Orbital ATK Space Systems Group	Supporting Organization	Industry	Dulles, Virginia
Orbital Sciences Corporation	Supporting Organization	Industry	
● Wallops Flight Facility(WFF)	Supporting Organization	NASA Facility	Wallops Island, Virginia

Technology Areas

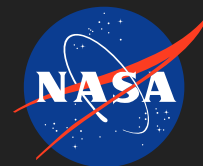
Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.2 Descent
 - └ TX09.2.1 Aerodynamic Decelerators

Target Destination

Foundational Knowledge

Low Density Supersonic Decelerators (LDSD)




Completed Technology Project (2011 - 2016)

Co-Funding Partners	Type	Location
Science Mission Directorate(SMD)	NASA Mission Directorate	

Primary U.S. Work Locations	
Alabama	Arizona
California	Connecticut
Delaware	Hawaii
Maryland	Texas
Virginia	

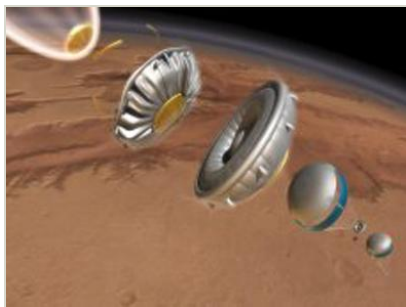
Project Transitions

 **October 2011:** Project Start

 **September 2016:** Closed out

Closeout Summary: Project supported supersonic parachute failure investigations and project reformulation activity through two tests. Directed to discontinue.

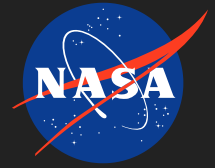
Images

**15110.jpg**

Project Image Low Density
Supersonic Decelerators (LDSD)
(<https://techport.nasa.gov/image/100837>)

Low Density Supersonic Decelerators (LDSD)

Completed Technology Project (2011 - 2016)



Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>